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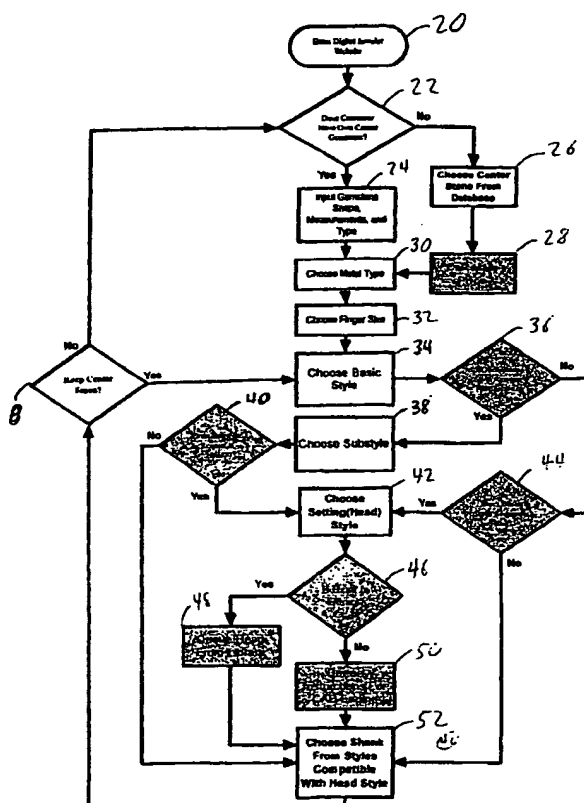Published:
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[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR DESIGNING CUSTOM JEWELRY

(57) Abstract: System and method to provide electronic custom jewelry design services for users comprising the steps of requesting the user's desired gemstone characteristics (24), requesting the user's gemstone jewelry setting characteristics (42), and generating a three dimensional image of the gemstone and jewelry setting characteristics.

WO 01/93156 A1

AMENDED CLAIMS
[received by the International Bureau on 18 December 2001 (18.12.01);
new claims 22-29 added; remaining claims unchanged (3 pages)]

(22)   A system for design and manufacture of jewelry products comprising:

a first user computer containing communication software to interrogate and answer

querys of a second server computer of parametric information;

a second computer containing a software program for a computer-aided design (CAD)

system capable of answering querys from said first computer, capable of querying

parametric information from a library of automated jewelry features to choose jewelry

features, capable of calculating and displaying costs and prices of chosen jewelry

features and jewelry products, and capable of submitting parametric information and

chosen jewelry features to a CAD engine for processing inline to animate a still or

rotatable image of jewelry product for use by the consumer and also a file format with

the toolpath to be used by a computer-aided manufacturing (CAM) machine to

manufacture jewelry product; and

a computer wide area network.

(23)   The system of Claim 22 wherein said library of jewelry features contains parametric

information comprising information of gemstones, jewelry styles, jewelry substyles,

jewelry head styles, jewelry shank styles, and options thereof, option prices, relative

strength and durability of various options, and popularity or aesthetic appeal of each

option

(24) The system of Claim 22 wherein said CAD system calculates the cost and price of each jewelry feature chosen as each jewelry feature is chosen, the cost and price of said jewelry product therefrom, and displays said cost, price and jewelry product therefrom upon a display screen.

(25) The CAD system of Claim 23 wherein said CAD system updates the said display and displays changes in costs, prices, jewelry features and changes of jewelry product as each change of choice is made by recalculating input information.

(26) The system of Claim 22 wherein display is provided on a single display screen of said first computer of all display changes in costs, prices, jewelry features, and jewelry product as each change of choices is made by means of said communication software of said first computer.

(27) The system of Claim 22 wherein said CAD system provides means of calculating costs and prices of said chosen library features and jewelry products thereof and means of displaying such upon a single display screen.

(28) The system of Claim 22 wherein said system comprises a first computer containing communication software to interrogate and answer querys of a second computer of parametric information, a second computer containing a software program for a computer-aided drafting (CAD) system capable of answering querys from said first computer, capable of quering parametric information from a library of jewelry features to choose jewelry features, capable of calculating and displaying costs and prices of chosen jewelry features and jewelry products, and capable of submitting parametric information and chosen jewelry features to a CAD engine for processing inline to create

AMENDED SHEET (ARTICLE 19)

still images, a rotatable image of a jewelry product, and a file containing tool path data for use by a computer-aided manufacturing (CAM) machine to manufacture jewelry product, a computer wide area network, a CAD engine, a CAM machine, a library of jewelry features, and a means of displaying said costs, prices, jewelry features and jewelry products.

(29)   The System of claim 22 wherein the user of the first computer, while obtaining pricing and visual formats of said parametric model, is not given access to the manufacturing file containing the toolpath used by the Compuer Aided Manufacturing (CAM) machine which produces the jewelry.

Basis for newly-submitted Claims 22-29 appears in the specification as submitted on pages 1 to 11 and Figures 1, 2A, 2B, and 2C and the original Claims 1 to 21. The detailed explanation of Figures 1 and the steps of the system as detailed, step-by-step, in Figures 2A, 2B, and 2C, support the newly submitted Claims 22-29 and the terms therein by specifically describing and explaining the mode of operation of the invented system for design and manufacture of jewelry products utilizing a CAD system, a CAD engine, a CAM machine, a library of jewelry features, a first computer, a second computer, a computer wide area network, a means of calculating costs and prices of features chosen of jewelry features.

AMENDED SHEET (ARTICLE 19)

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Detailed Description

While this invention is susceptible of embodiment in many different forms, there

is shown in the drawings and will herein be described in detail preferred embodiments of

the invention with the understanding that the present disclosure is to be considered as an

5   exemplification of the principles of the invention and is not intended to limit the broad

aspect of the invention to the embodiments illustrated. For example, the operation of the

present system will be described with reference to the custom design of a ladies ring.

However, it will be apparent to one of ordinary skill in the art that the present invention

can be implemented with respect to many different types of jewelry, for example

10   bracelets, necklaces, earrings, and the claims of the present application should not be

limited to rings. It is also contemplated that the present invention can be used to design

other items which contain precious metals or gemstones, such as custom silverware.

Referring to Figure 1, a preferred embodiment of the invention comprises a client

computer 2 and a custom jewelry design server 4. Each computer 2, 4 is attached to a

15   computer network 8. The computer network 8 is preferable a wide area network, such as

the Internet, so that the computers 2, 4 can be remotely located with respect to each other.

The client computer 2 executes a client software program 10 which allows the consumer

to communicate with the custom jewelry design server 4. Preferably the client software

program 10 comprises a standard web browser, such as Microsoft Internet Explorer or

20   Netscape Navigator. The client computer can be any computer which has the capability

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to receive input, display results and communicate via the Internet, such as a personal

computer or a portable digital assistant. Optionally, the present system can further

include a jeweler's computer 6. The jeweler's computer 6 is attached to the computer

network 8 and can communicate with the custom jewelry design server 4 to receive

5   electronic parametric information about the custom jewelry, as explained below. The

computer network of the present invention includes a "direct-dial" network facilitating

standard telephone lines.

The custom jewelry design server 4 executes custom jewelry design software 12.

The custom jewelry design software 12 is responsive to requests by a user using the client

10   computer 2, as explained below. The custom jewelry design server 4 also contains

information about various gemstones, jewelry styles, jewelry substyles, jewelry head

styles, jewelry shank styles and other jewelry attribute information. The custom jewelry

design software 12 also employs a Computer Aided Design (CAD) Engine 9 for

rendering three dimensional images.

15   Referring to Figure 2, to use the system of the present invention, in step 20 the

user enters the Internet web address of the custom jewelry design server 4, such as

www.digitaljeweler.net, into the web browser software on the client computer 2. In step

22, next the custom jewelry design server 4 inquires if the user has his own center

gemstone. If the user responds that he does have his own gemstone, the user is asked in

20   step 24 to enter the gemstone shape, measurements and type. If the user does not have

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his own gemstone, the user is asked to choose a center gemstone from a database of

available center gemstones having different shapes, sizes and type in step 26. In step 28,

the custom jewelry design server 4 calculates the price of the gemstone selected and

displays the price to the user.

5   Next, the user is asked to choose a type of metal in step 30 for the ring and a

finger size in step 32. In step 34, the user is asked to choose a basic style for the ring.

Next, in step 36 the custom jewelry design server 4 determines if the selected basic style

requires the choice of a substyle. If the basic style requires the choice of a substyle, the

custom jewelry design server 4 advances to step 38 where the user is requested to choose

10   a substyle from a list of substyles which are compatible with the style chosen. Next, in

step 40 the custom jewelry design server 4 determines if a head setting is required for the

substyle chosen. If a head is required, the custom jewelry design server 4 determines

which heads are compatible with the basic style and substyle chosen, and the user is

asked to select a compatible head from a list of compatible heads in step 42. After a head

15   is chosen, the custom jewelry design server 4 determines if the head chosen is in a head

library on the custom jewelry design server 4 in step 46. If the head is in the head library,

the custom jewelry design server 4 queues the rendered head from the head library in step

48 for later display. If the head is not in the head library the custom jewelry design server

4 queues parametric information about the head from the CAD engine in step 50. The

20   custom jewelry design server 4 then advances to step 52.

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If in step 36, the custom jewelry design server 4 determines that the basic style chosen does not require the selection of a substyle, the custom jewelry design server 4 advances to step 44. In step 44, the custom jewelry design server 4 next determines whether the basic style chosen requires a head. If the basic style requires a head, the custom jewelry design server 4 advances to step 42, described above.

If the basic style chosen does not require a head in step 44, the custom jewelry design server 4 advances to step 52. Similarly, if the custom jewelry design server 4 at step 40 determines the substyle chosen does not require a head, the custom jewelry design server 4 advances to step 52. At step 52, the custom jewelry design server 4 determines which shank styles are compatible with the gemstone, basic style, substyle, and/or head previously chosen and requests the user to select a shank style from the compatible shank styles and advances to step 54.

At step 54, the custom jewelry design server 4 determines shank thicknesses which are compatible with the shank selected and requests the user to select a shank thickness from a list of compatible shank thicknesses and advances to step 56. At step 58, the custom jewelry design server 4 determines whether the shank is available from the shank library. If the shank is available from a shank library, the custom jewelry design server 4 queues the rendered shank from the shank library in step 60 for later display. If the shank is not available from the shank library, the custom jewelry design server 4 queues parametric information about the shank for the CAD engine in step 62.

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At step 64, the custom jewelry design server 4 requests the user to determine whether side gemstones will be on the ring. If the ring will include side gemstones, the custom jewelry design server 4 advances to step 66 where the user can select the shape, size, setting and type of gemstone to be used as side gemstones. Next, the custom jewelry design server 4 advances to step 68.

If, at step 64, the user chooses to not include side gemstones, the custom jewelry design server 4 advances to step 68. At step 68, the price of the ring as configured is calculated and displayed to the user. The custom jewelry design server 4 then advances to step 70 where the system asks the user if the price is acceptable. If the price is not acceptable, the custom jewelry design server 4 returns to step 54. If the price is acceptable, the system advances to step 72 where the user is requested to select whether the ring will include other modifying attributes including, but not limited to, a taper. If the ring does not include a taper, the custom jewelry design server 4 advances to step 76. If the ring is to include a taper, the custom jewelry design server 4 queues parametric information about the taper for the CAD engine at step 74 and advances to step 76.

At step 76, the user is requested to choose whether the ring will have other accents. If the user chooses not to include other accents, the custom jewelry design server 4 advances to step 80. If the user chooses to include other accents, the custom jewelry design server 4 advances to step 78 where it recalculates the price of the ring and advances to step 80. At step 80, the custom jewelry design server 4 submits the queued

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parametric information to the CAD engine where it waits to be processed inline with

other simultaneous users at step 82. The CAD engine then renders and animates the ring

as the user has previously chosen at step 84. The rendering can be either be a still image

or, optionally, a rotatable image, such as an Adobe QuickTime VR image.

5   At step 86, the custom jewelry design server 4 asks the user if he is satisfied with

the final appearance of the ring. If the user is not satisfied with the final appearance of

the ring, the custom jewelry design server advances to step 88. At step 88, the user

determines whether he would like to restart the design process with the same gemstone or

with a new gemstone. If the user chooses to restart the process with a new gemstone, the

10   custom jewelry design server 4 returns to step 22. If the user chooses to restart the design

process with the same gemstone, the system returns to step 34. It is also contemplated

that the present system will allow a user to back up any specified number of steps in order

to change a choice previously made.

         If the user is satisfied with the final appearance of the ring, the custom jewelry

15   design server 4 advances to step 90. At step 90, the custom jewelry design server 4 saves

a file containing the parametric information queued for the CAD engine in an electronic

format appropriate for the CAM engine used and, optionally, textual information

describing the choices made in the design process. Next, at step 92, the user is asked to

pay for the ring. The parametric information file is then processed in step 94 into layers

10

or slices for use by a Computer Aided Manufacturing (CAM) machine to create either a wax model or a direct metal fabrication technique in step 96.

Next, in step 98 the custom jewelry design server 4 determines if a jeweler who will make the ring requires a wax model. If the jeweler does require a wax model, the wax model is shipped in step 100 and the jeweler is invoiced in step 102. If the jeweler does not require a wax model, the ring is cast in step 104. Next, in step 106 the custom jewelry design server 4 determines whether jeweler wishes to finish the ring and set the mounting. If the jeweler does wish to finish the ring and set the mounting, the casting is shipped to the jeweler in step 108 and the jeweler is invoiced in step 102. If the jeweler does not wish to finish the ring and set the mounting, the manufacturer finishes the ring and sets the mounting in step 110 and invoices the jeweler in step 102. It is also contemplated that rather than sending the jeweler a wax model, unfinished ring or finished ring, the electronic file containing parametric information regarding the ring can be electronically transferred to the jeweler's computer 6 to allow the jeweler to manufacture the ring from a wax model or directly fabricate it from a CAD parametric information.

It is also contemplated that at each step the user is asked to make a choice, informative information about each choice is provided in order to help the user arrive at a decision. Informative information can include, but is not limited to, information

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regarding the price of the various options, the relative strength and durability of various options, and an opinion about the popularity or aesthetic appeal of each option.

Further, it is contemplated that rather showing the price at two points in the design process, that the price be recalculated after each choice is made by the user.

5 Finally, it is also contemplated that the present system can be implemented by providing all of the design choices on a single display screen of the client computer 2. Each time a design choice is changed the ring is redisplayed to the user and the price updated to reflect the design change.

While the specific embodiments have been illustrated and described, numerous

10 modifications come to mind without significantly departing from the spirit of the invention and the scope of protection is only limited by the scope of the accompanying claims.

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CLAIMS

I claim:

1. A method of providing electronic custom jewelry design services for users over a wide area network comprising the steps of:

    requesting the user's desired gemstone characteristics via the wide area network;

    requesting the user's jewelry setting characteristics via the wide area network; and

    generating parametric information describing the desired gemstone settings and the user's jewelry settings from which the jewelry can be manufactured.

2. The method of claim 1 further comprising the steps of:

    generating a three dimensional image of the gemstone and gemstone setting; and

    transmitting the three dimension image to the user over the wide area network.

3. The method of claim 1 wherein the step of requesting the user's desired gemstone characteristics comprises the step of:

    requesting the user to provide gemstone shape data, measurement data, and type data.

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4. The method of claim 1 wherein the step of requesting the user's desired gemstone characteristics comprises the steps of:

displaying a plurality of gemstones;

requesting the user to choose a gemstone from the plurality of gemstones;

displaying the chosen gemstone in a plurality of shapes;

requesting the user to choose a shape of the gemstone; and

displaying the chosen gemstone with the chosen shape.

5. The method of claim 3 further comprising the step of displaying current jewelry cost information after each displaying step.

6. The method of claim 1 where the step of requesting the user's gemstone setting characteristics comprises the steps of:

displaying a plurality of gemstone setting styles;

requesting the user to choose a gemstone setting style;

displaying the chosen gemstone setting style in a plurality of setting shank styles; and

requesting the user to choose a setting shank style.

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7. The method of claim 6 further comprising the step of displaying current jewelry cost information after each displaying step.

8. The method of claim 6 wherein a gemstone is shown in the gemstone setting for the recited steps of:

displaying a plurality of gemstone setting styles; and

displaying the chosen gemstone setting style in a plurality of setting shank styles.

9. The method of claim 6 wherein the step of displaying a plurality of gemstone setting styles further comprises indicating whether a particular gemstone setting will not work with a chosen gemstone shape, measurement or type.

10. A system for providing electronic custom jewelry design services for users over a wide area network comprising:

means for requesting the user's desired gemstone and for requesting the user's jewelry setting via the area network; and

means for generating parametric information describing the desired gemstone settings and the user's jewelry settings from which the jewelry can be manufactured.

15

11. The system of claim 10 further comprising:

means for generating a three dimensional image of the gemstone and jewelry

setting; and

means for transmitting the three dimensional image of the gemstone and jewelry

5   setting over the wide area network.

12. The system of claim 10 wherein the means for requesting the user's desired

gemstone comprises:

means for requesting the user to provide gemstone shape data, measurement data,

and type data.

13. The system of claim 10 wherein the means for requesting the user's desired

gemstone comprises:

means for displaying a plurality of gemstones, for displaying a chosen gemstone

in a plurality of shapes, and for displaying the chosen gemstone with the chosen shape;

5   and

means for requesting the user to choose a gemstone from the plurality of

gemstones and for requesting the user to choose a shape of the gemstone.

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14. The system of claim 13 further comprising means for displaying current jewelry cost information.

15.ʹ The system of claim 10 wherein the·means for requesting the user's gemstone setting comprises:

means for displaying a plurality of gemstone setting and displaying the chosen gemstone setting in a plurality of setting shank styles; and

means for requesting the user to choose a gemstone setting and requesting the user to choose a setting shank style.

16. The system of claim 15 further comprising means for displaying current jewelry cost information.

17. The method of claim 15 wherein the means for displaying further comprises means for showing the gemstone in the gemstone setting.

18. The system of claim 15 wherein the means for displaying a plurality of gemstone setting styles further comprises means for indicating whether a particular gemstone setting is not compatible with the chosen gemstone.

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19. A method of offering custom jewelry to a user comprising:

providing a custom jewelry design server implementing a CAD software package

and being connected to a wide area network;

'requesting the user to choose preferred attributes of the custom jewelry via the

5   wide area network; and

providing the custom jewelry to the user.

20. The method of claim 19 wherein the wide area network is a direct dial

network.

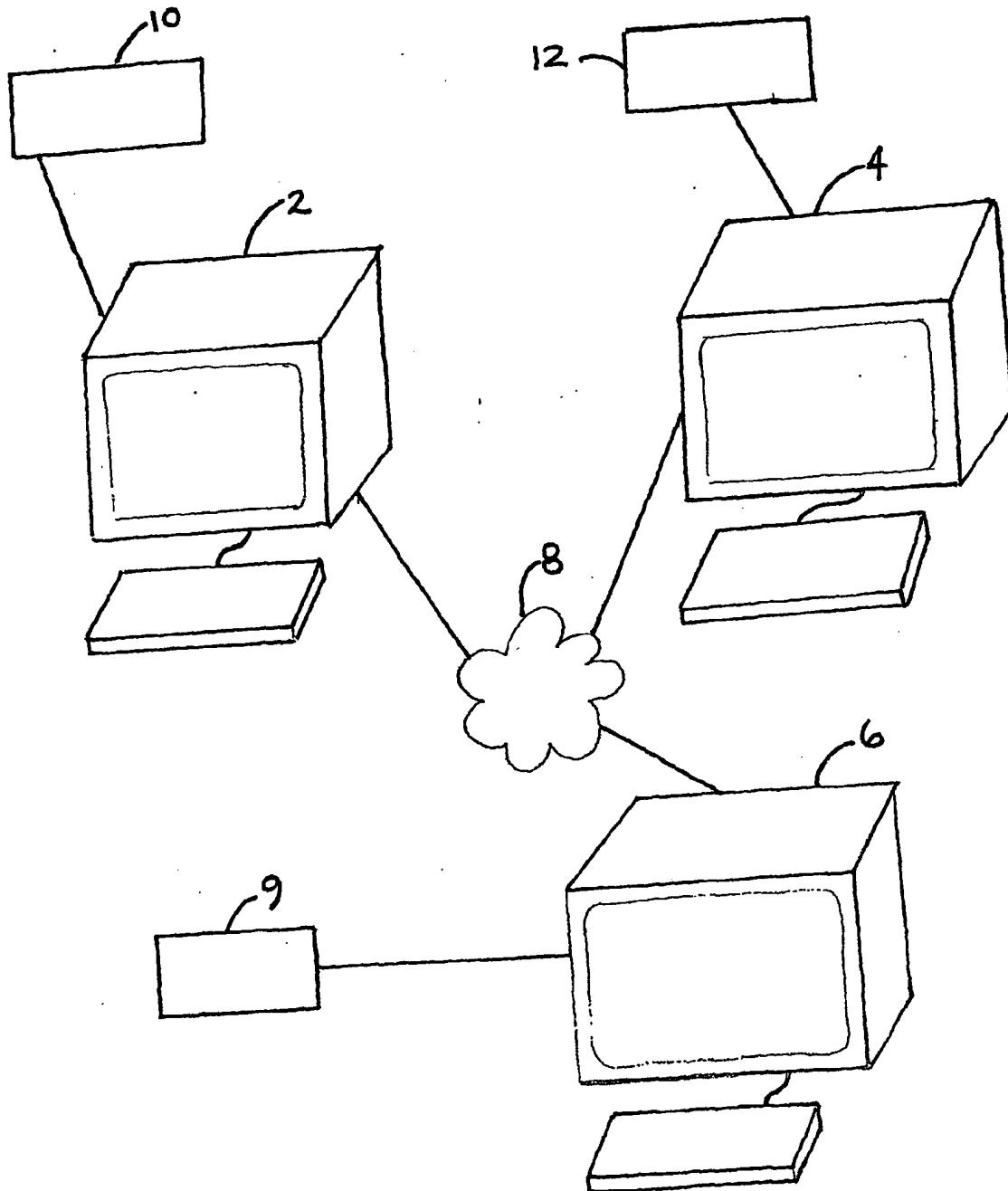21. The method of claim 19 wherein the custom jewelry is silverware.

Fig. 1

Fig.2A

Enter Digital Jeweler Website *20*

22 Does Customer Have Own Center Gemstone?

No → Choose Center Stone From Database *26*

Yes ↓ Input Gemstone Shape, Measurements, and Type *24*

28 (shaded box)

Choose Metal Type *30*

Choose Finger Size *32*

Keep Center Stone? — No / Yes

Choose Basic Style *34*

36 (shaded diamond) No / Yes

Choose Substyle *38*

40 (shaded diamond) No / Yes

Choose Setting(Head) Style *42* — Yes — *44* (shaded diamond) — No

46 (shaded diamond) Yes / No

48 (shaded box)

50 (shaded box)

Choose Shank From Styles Compatible With Head Style *52* (46)

Choose Shank
Thickness ——— 54

Apply Other
Parametrics
Applicable To
Shank Style ——— 56

58

Queue Shank
For Factory ——— 60   Yes

No   62
Queue
Instructions For
CAD Engine

Fig. 2B

64
Are There
Side Stones?   No

Yes

Choose Side Stone
Shape, Size, And
Setting Style ——— 66

70
Is Price
Acceptable?   Calculate
Price

No   Yes   68

72
Taper?
Y/N   No

Yes   74
Queue For CAD

76
No   Other
Accents?

Yes   78
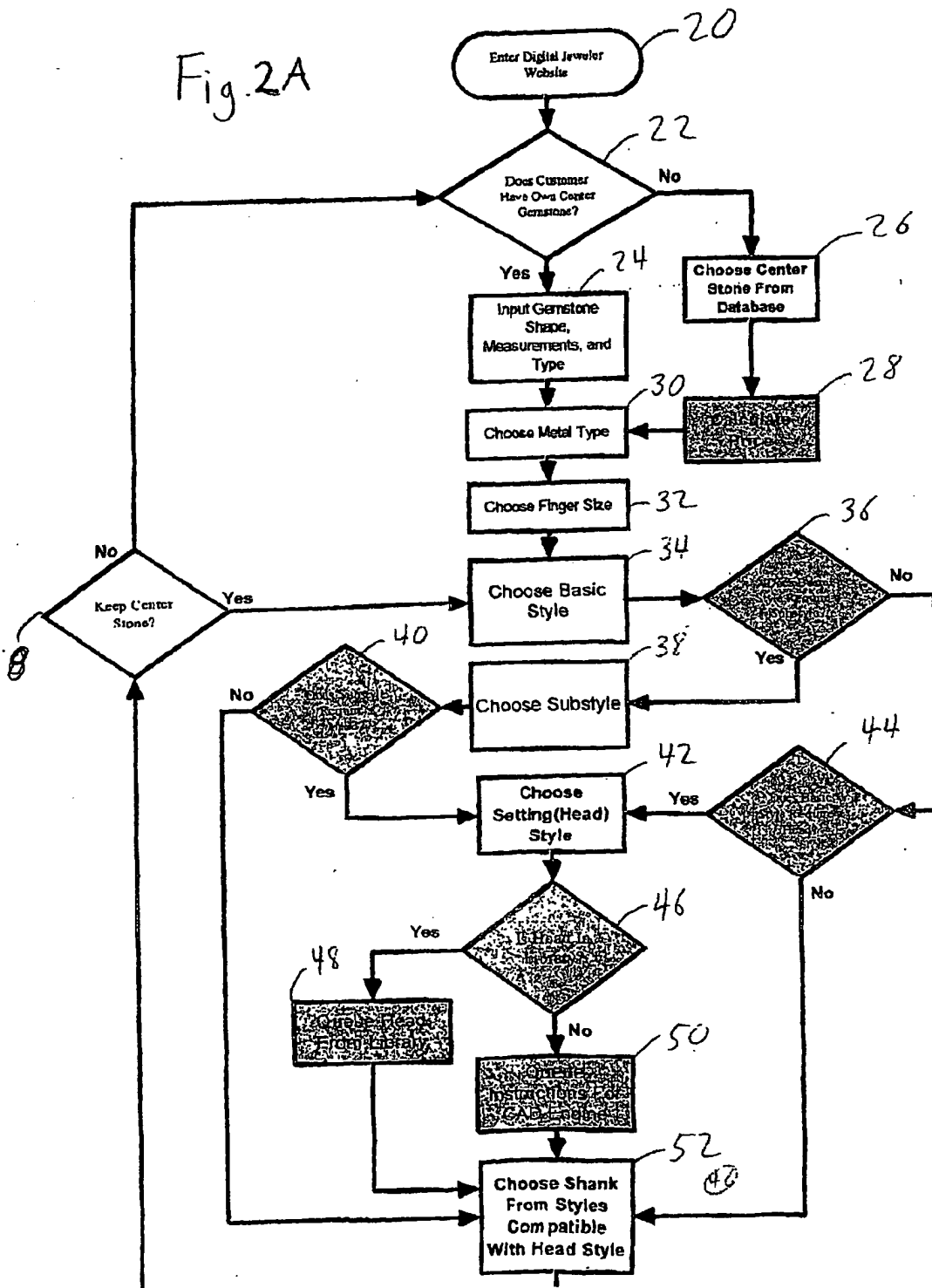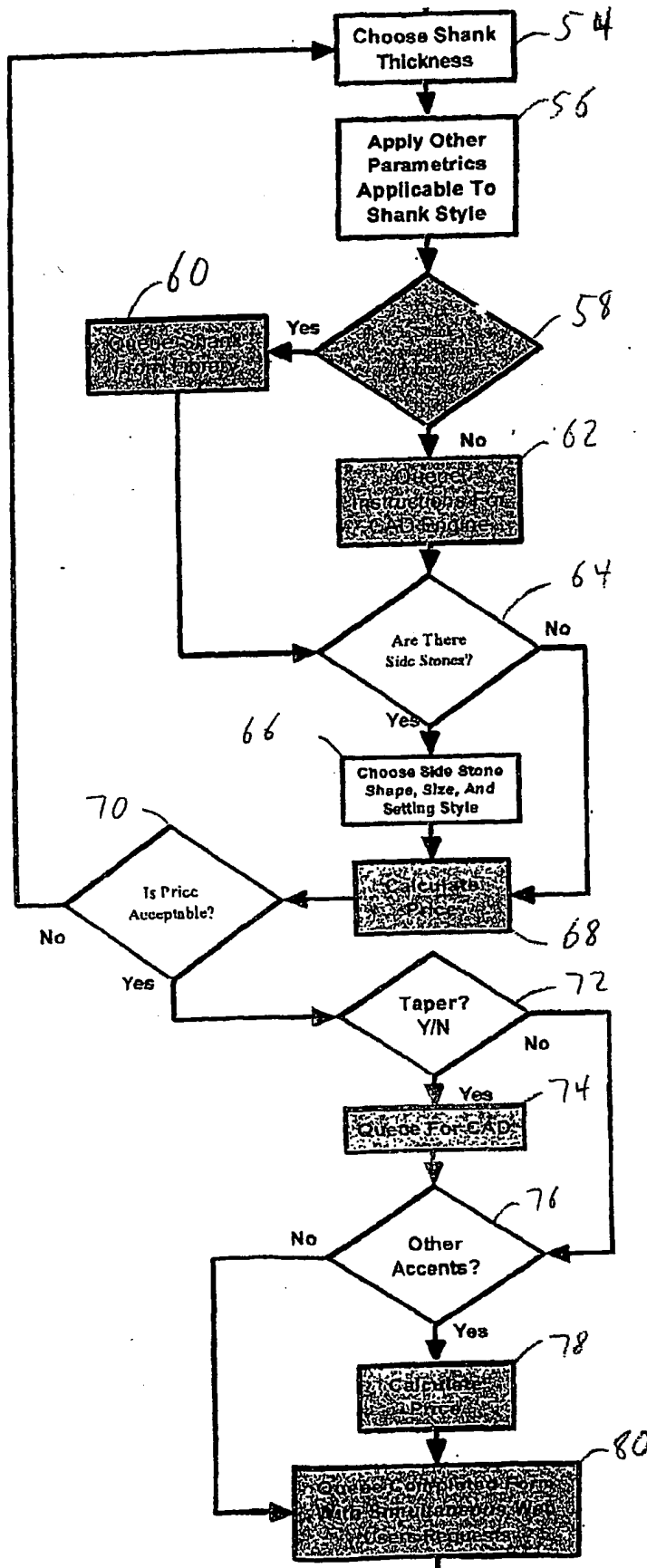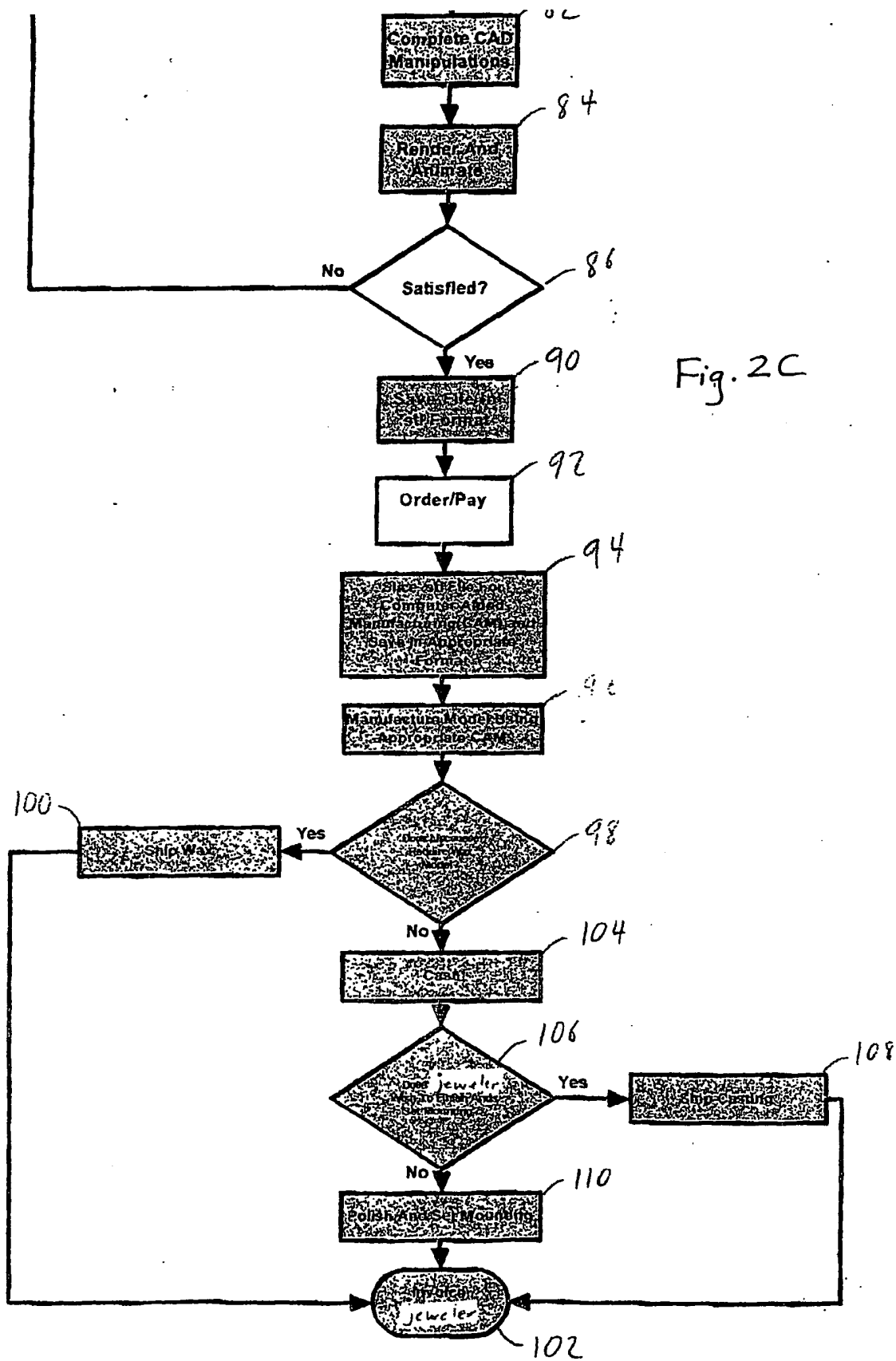Calculate
Price

80

Fig. 2C

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/16336

A.   CLASSIFICATION OF SUBJECT MATTER
IPC(7)   :   G06F 17/60
US CL   :   705/26, 27
According to International Patent Classification (IPC) or to both national classification and IPC

B.   FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
    U.S. : 705/26, 27

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DIALOG

C.   DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	WO 00/57254 A1 (LASER OPTRONIC TECHNOLOGIES) 28 September 2000 (28.09.00), Abstract and Summary.	1-3, 6, 8-12, 15, 17, 19-21
X	No Author "Diamond Information Center Launches Innovative New Design your Own Diamond Engagement Ring Feature on Website" (PR Newswire) 17 June 1999 (1999-06-	1, 10
Y	US 5, 796, 986 A (FULLER) 22 August 1996 (22.08.1996), Figure 1.	1, 10, 19
Y	US 4, 725,511 A (REBER) 05 May 1986 (05.05.1986), column 3, lines 67-68; column 4, lines 1-20.	19
Y	US 6, 003,228 A (RIGGIO) 14 May 1998 (14.05.1998), column 2, lines 3-33; column 4, lines 10-67; column 5, lines 1-67.	1, 2, 10, 11, 19
Y	US 4 2,106, 221 A (SELON) 02 February 1977 (02.02.1977), column 1, lines 6-64; column 2, lines 54-68; column 3, lines 29-38; column 5, lines 38-39.	1, 3, 4, 10, 12, 13, 17
Y	US 5, 970,471 A (HILL) 22 March 1996 (22.03.1996), column 1, lines 6-13; column 2, lines 7-35; column 3, lines 11-22; column 4, lines 6-18; column 5, lines 20-26.	1, 3, 4, 6, 8, 10, 12, 13, 15, 17, 19, 20
Y	WO 93 20522 A1 (AB AUTOENGRAVING) 14 October 1993 (14.10.93), Abstract and Summary.	1, 10
Y	No Author "Industry Takes Hi-Tech Hike to Future" (Israel Business Today) 31 March 1997 (1997-03-31), The whole article.	1, 19

☒ Further documents are listed in the continuation of Box C.   ☐   See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance		
"E"	earlier application or patent published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 August 2001 (29.08.2001)	**18 OCT 2001**
Name and mailing address of the ISA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Naeem Haq
Facsimile No.	Telephone No. 703-305-8052

Form PCT/ISA/210 (second sheet) (July 1998)